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Internal hernia beneath the obturator nerve after robot-assisted radical cystectomy and pelvic lymphadenectomy: A case report with literature review

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Informed consent statement

The patients have given informed consent for the creation of this literature.

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Abstract

A man in his 40s presented with vomiting and numbness in the right thigh. Eight months earlier, he had undergone robot-assisted radical cystectomy and pelvic lymphadenectomy for bladder cancer. Computed tomography (CT) revealed a caliber change and a closed loop of the small intestine in the right pelvis, prompting emergency diagnostic laparoscopy. Intraoperative findings showed that the small intestine had herniated into the space between the right obturator nerve and pelvic wall, resulting in strangulated intestinal obstruction. The necrotic small intestine was resected and reconstructed, while preserving the obturator nerve. The hernia orifice was not repaired during the surgery.

We encountered a rare case of an internal hernia involving the obturator nerve as the cord. In patients with abdominal distension and thigh symptoms following pelvic lymphadenectomy, internal hernia should be considered. The optimal approach for hernia repair involving the obturator nerve remains undetermined, necessitating a case-by-case approach.

Key words

Internal hernia, obturator nerve, strangulated intestinal obstruction

Introduction

Adhesions and various gaps are known to cause internal hernias after abdominal surgery. However, to the best of our knowledge, internal hernias caused by the obturator nerve are rare. Here, we report a case of internal hernia caused by a space beneath the obturator nerve and the accompanying obturator artery after robot-assisted radical cystectomy and pelvic lymphadenectomy.

Case Presentation

A man in his 40s presented to our hospital with vomiting and numbness in the right thigh. Computed tomography (CT) indicated a diagnosis of strangulated intestinal obstruction, and the patient was referred to our department. Eight months earlier, he had undergone robot-assisted radical cystectomy, with pelvic lymphadenectomy and extra-corporeal ileal conduit construction for bladder cancer (cT3a, cN0, cM0, cStageIII), after three cycles of neoadjuvant chemotherapy (NAC) with gemcitabine and cisplatin (GC therapy). The postoperative course was uneventful, and the patient was discharged on the 13th postoperative day. The postoperative pathological findings were ypT0, ypN0, cM0, ypStage0.

Physical examination revealed a distended but soft abdomen, with no abnormal vital signs or symptoms of peritoneal irritation. The patient had mild numbness in the right thigh but no difficulty walking. Laboratory tests showed a WBC count of 11,800/ μ L, CRP of 1.11 mg/dL, BUN of 34 mg/dL, and creatinine of 1.45 mg/dL, indicating mild inflammation and renal dysfunction. Enhanced CT revealed a caliber change and a closed-loop sign of the small intestine on the right side of the pelvis, with a moderate ascites. The dilated and edematous intestine showed poor contrast enhancement (Fig. 1). Emergency surgery was performed based on the diagnosis of strangulated intestinal

obstruction.

Laparoscopic surgery was initiated as the patient's vital signs were stable, revealing a dilated small intestine in the pelvis. The small bowel was in a state of internal hernia, with the intestine inserted into the space between the right obturator nerve or artery and the abdominal wall, forming a hernia portal (Fig. 2a). The herniated bowel was markedly dilated, confirming a diagnosis of strangulated intestinal obstruction. Adhesions were observed around the ileal conduit, but these were not related to the formation of the hernia orifice. First, we performed laparoscopic repositioning of the herniated bowel, followed by resecting approximately 50 cm of the necrotic small intestine through a 10-cm incision. Laparoscopic reexploration of the abdominal cavity after bowel reconstruction revealed multiple spaces formed by the previously exposed bilateral obturator nerves, vessels, and external iliac vessels, all without adhesions (Fig. 2b). In this case, the hernia orifice remained unrepaired due to difficulties in suturing the defect, which were caused by scar tissue from the previous surgery, a lack of elasticity in the surrounding tissues, and the potential disadvantages of mesh placement. The operation lasted for 1 hour 58 minutes, with minimal blood loss. Postoperatively, the numbness in the right thigh resolved, and the patient's recovery was uneventful. The patient was discharged on the 8th postoperative day without any complications. The patient remained asymptomatic with no recurrence at 18 months postoperatively.

Discussion

Internal hernia is a condition where an organ migrates into an intra-abdominal recess, pouch, or aperture, such as the mesentery or omentum. Steinke et al.¹ classified internal hernias into “peritoneal fossa hernias,” involving entrapment in a recess or pouch, and “abnormal aperture hernias,” where entrapment occurs in an abnormal aperture. The

primary cause of small bowel obstruction after radical cystectomy is adhesions, while internal hernias account for as few as 0.5–4.1%.² In the present case, the internal hernia was an abnormal aperture type, where the small intestine herniated through an orifice formed by the right obturator nerve, obturator artery, and the adjacent abdominal wall, resulting from nerve and artery exposure after lymphadenectomy. The fixed position of the small intestine used as a conduit, typically constructed in the right lower abdomen, may predispose patients to the development of internal hernias, particularly on the right side.

Fujiwara et al.³ reviewed cases of strangulated small bowel obstruction following pelvic lymphadenectomy from 1978 to 2024 and identified 21 cases caused by various factors, including the external iliac artery and umbilical ligament. Among these, six cases, including the present one, involved internal hernias with the obturator nerve functioning as a hernia cord. A PubMed search using the terms “Obturator nerve” and “Internal hernia,” combined with our case, revealed the reported cases (Table 1)³⁻⁷.

All reported cases involved laparoscopic or robot-assisted procedures. However, no definitive evidence indicates that the occurrence of internal hernias is higher with minimally invasive surgery than with open surgery. Stommel et al.⁸ and Hashida et al.⁹ noted that laparoscopic colorectal surgery resulted in fewer intra-abdominal adhesions compared to open surgery, potentially reducing the incidence of adhesive bowel obstruction following laparoscopic procedures. However, the same reduction in adhesion may also increase the risk of bowel obstruction caused by internal hernias. While laparoscopic approaches offer advantages in reducing adhesive complications, we should be aware of the potential increased risk of internal hernia-related obstructions.

In five of the six reported cases, the hernia occurred on the right side. Tanaka et al.¹⁰

suggest two factors that may explain this right-side predominance. First, peristalsis in the small intestine naturally directs bowel movement towards the right lower abdomen, where the terminal ileum is located. Second, the left-sided hernial orifice is effectively obstructed by the presence of the sigmoid colon. Additionally, following total cystectomy, the frequent placement of the ileal conduit near the ileocecal region may further contribute to this right-sided occurrence.

In this case, we did not perform closure of the hernia orifice. The first reason was that the surrounding tissues had become scarred due to previous surgery, resulting in a lack of elasticity, which made suture closure difficult. Secondly, we considered that mesh coverage might lead to infection or exacerbation of neurological symptoms. In a review of past case reports (Table 1), hernia orifice closure was not performed in any cases, except for one. These unrepaired case reports may reflect a similar opinion to ours, although they do not provide detailed explanations. In one case, the hernial orifice was removed by excising the obturator and umbilical arteries, resulting in postoperative walking difficulties. There is a report of covering the area from the external iliac artery to the retroperitoneum with collagen patches.¹¹ However, this approach was feasible in these cases because the obturator nerve was not involved. If the obturator nerve is involved in a hernia defect, closing the hernia with a patch may risk causing obturator nerve injury.

Symptoms of nerve irritation, such as thigh pain, were observed in five of the six cases. This occurs because the entrapped bowel in the internal hernia places stress on the obturator nerve, which forms the hernia orifice. Thigh nerve symptoms are considered typical clinical findings in internal hernias associated with the obturator nerve. As it is difficult to make a preoperative diagnosis based on CT findings alone, the presence of neurological symptoms can help with preoperative diagnosis and also act as

a warning to avoid accidentally cutting the obturator nerve during surgery.

Intraoperative findings of bowel necrosis and subsequent resection were noted in five cases, suggesting that bowel obstruction from internal hernias can easily progress to strangulation. It is crucial to consider the possibility of an internal hernia involving the pelvic structures and respond promptly when symptoms such as vomiting, abdominal pain, or thigh pain appear following pelvic lymphadenectomy.

We report a rare case of an obturator nerve-related internal hernia leading to strangulated small-bowel obstruction, along with a review of previous cases. If patients present with abdominal pain, vomiting, and thigh pain after pelvic lymphadenectomy, an internal hernia involving the pelvic structures, particularly the obturator nerve, should be considered. The optimal approach to hernia repair involving the obturator nerve remains undefined. Therefore, it is necessary to explore the appropriate approach for each individual case and gather additional cases to refine and develop effective treatment strategies.

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Conflict of interest

The authors declare that they have no conflict of interest.

Dr. Toshiaki Shichinohe is an Editorial Board member of ASES Journal and a co-author of this article. To minimize bias, they were excluded from all editorial decision-making related to the acceptance of this article for publication.

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228 **Figures**

229 Fig 1: Enhanced CT of abdomen

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231 Caliber changes in the small intestine are observed in the right pelvis (arrowhead).

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234 Fig 2: Intraoperative findings

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236 a: The small intestine is strangulated by the obturator nerve.

237 b: The bilateral obturator nerves (arrowhead) formed orifices on each side (arrow).

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239 Table1: Reports of internal hernia occurring due to the obturator nerve functioning as a
240 strangulating cord

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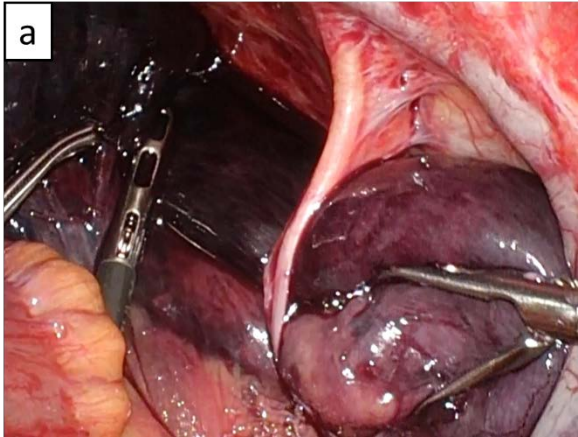
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243 Duration: Time from initial surgery to internal hernia surgery.

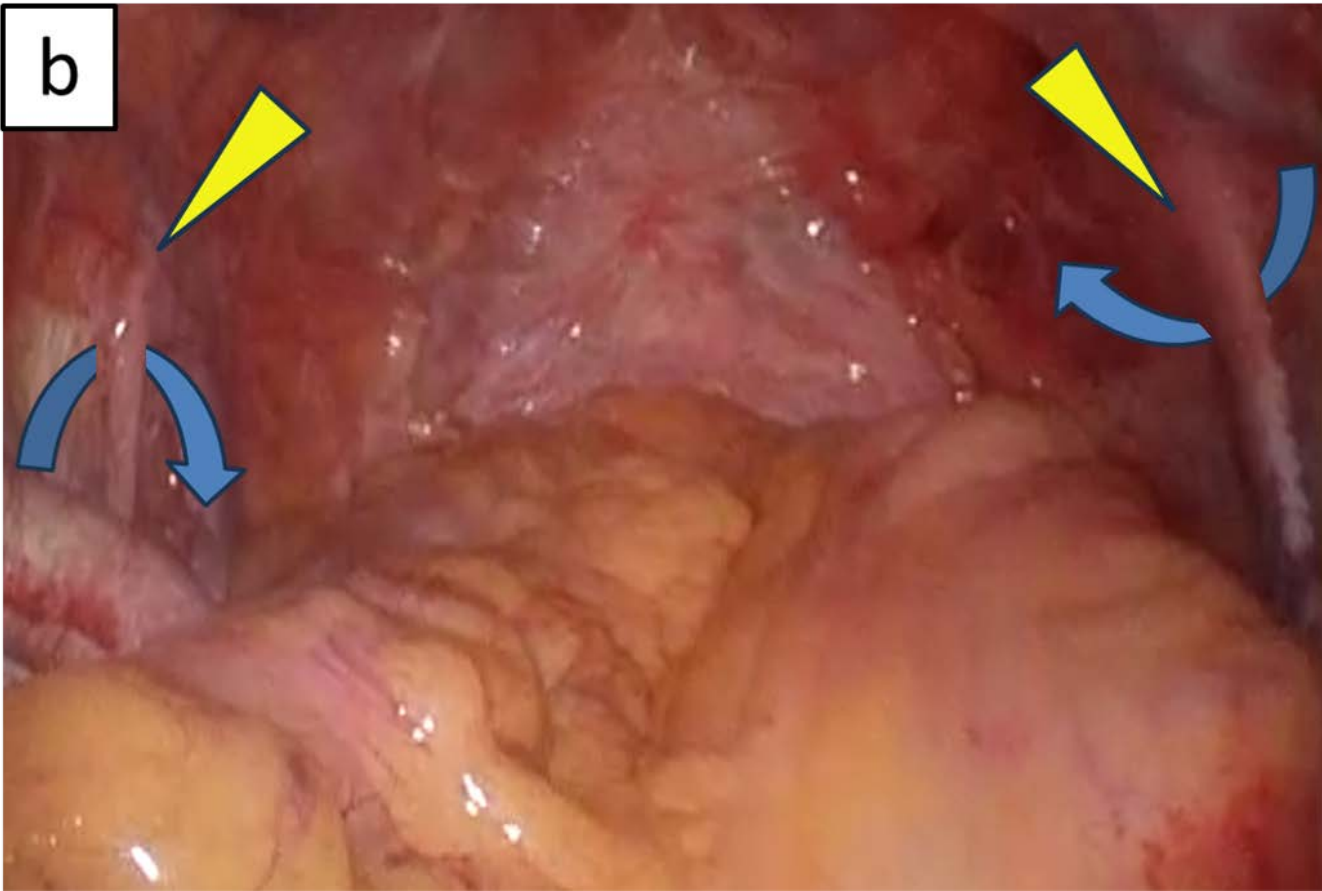
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a



b



Author	Age Sex	Primary disease	Previous surgery	Duration※	Hernial orifice	Neurological symptom	Bowel resection	Closure of defect	Year
Minami et al	38y F	Cervical	Lap-radical hysterectomy	6m	Right umbilical artery and obturator nerve	Yes	Yes	Unrepaired	2017
		Cancer	pelvic lymphadenectomy						
Uehara et al	63y M	Rectal	Rob-low anterior dissection	1m	Right obturator nerve	Yes	Yes	Unrepaired	2020
		Cancer	right lateral lymph node dissection						
Kanno et al	78y M	Bladder	Lap-radical cyctectomy	38m	Right obturator nerve	No	Yes	Unrepaired	2020
		Cancer	pelvic lymphadenectomy						
Ideyama et al	57y F	Endometrial	Lap- semi-radical total hysterectomy	9m	Right obturator nerve and umbilical artery	Yes	Yes	Repaired	2022
		Cancer	pelvic lymphadenectomy					by resection	
Fujiwara et al	68y M	Rectal	Lap-perineal rectum amputation	52m	Left obturator nerve	Yes	No	Unrepaired	2024
		Cancer	lateral lymph node dissection						
Ours	49y M	Bladder	Rob-total cyctectomy	8m	Right obturator nerve and artery	Yes	Yes	Unrepaired	2024
		cancer	pelvic lymphadenectomy						